

CLAIMS

What is claimed is:

1. A method for controlling downlink transmission power levels in a spread spectrum time division communication system having frames with time slots for communication, the method comprising:

- a) receiving at a user equipment (UE) a downlink communication from a base station and determining an error rate of the received communication,
- b) producing power level adjustments for each of said time slots based in part on the error rate,
- c) transmitting an uplink communication from the UE to the base station including the power level adjustments for each of said time slots; and
- d) setting a transmission power level for each time slot in said downlink communication in response to said power level adjustments.

2. The method of claim 1 further comprising:

- f) generating a signal to interference ratio (SIR) based on the error rate determined at step.

3. The method of claim 2 further comprising:

- g) comparing the SIR obtained in step f) with a target level, a result of comparison in step g) being used to determine the power level adjustment of step b).

4. A downlink power control system for use in a spread spectrum time division communication system having frames with time slots for communication, comprising:

a user equipment for determining an error rate of a downlink communication and producing power level adjustments in response to said error rate for each of said time slots of said downlink communication; and

a base station for transmitting said downlink communication and setting a transmission power level for each of said time slots in said downlink communication responsive to power level adjustments received from said UE.

5. A method for controlling downlink transmission power levels in a spread spectrum time division duplex communication system having time slots for communication, the method comprising:

a) receiving a downlink communication from a base station and determining an interference power measurement for each of said time slot used by the downlink communication at a UE;

b) transmitting an uplink communication having said interference power measurement for each of said time slots from the UE; and

c) setting a transmission power level at the base station for the UE for each of said time slots in said downlink communication in response to said interference power measurement for each of said time slots.

6. The method of claim 5 further comprising the steps of:
determining an error rate of the downlink communications; and
generating a power level adjustment based in part on the error rate.

7. The method of claim 6 wherein step c includes modifying said power level adjustment using said interference power measurement for each downlink communication time slot.

a user equipment for receiving a downlink communication and transmitting interference power measurement for each downlink communication time slot to a transmitting station; and

9. The downlink power control system of claim 8 wherein said station is a base station.

11. The system of claim 9 wherein a radio network controller receives said interference power measurements for each of said slots and forwards them to said base station.

13. A method for controlling downlink transmission power levels in a spread spectrum time division duplex communication system having time slots for communication, the method comprising:

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b) setting a transmission power level for each downlink communication time slot in response to said estimated interference power level for each downlink communication time slot.

14. A downlink power control system for use in a spread spectrum time division duplex communication system having time slots for communication comprising:

a user equipment for receiving a downlink communication; and

a station for calculating an estimated interference power level for each downlink communication time slot and setting a transmission power level for each downlink communication time in response to said estimated interference power level in each downlink communication time slot.

15. The system of claim 14 wherein said station is a node B.

16. The system of claim 15 wherein said node B further forwards said transmission power level for each of said time slots to a base station.

17. The system of claim 14 wherein said station is a radio network controller (RNC).

18. The system of claim 17 further comprising a node B for receiving said transmission power level for each of said time slots from said RNC and forwarding said transmission power level for each of said time slots to a base station.

19. A method for controlling downlink transmission power levels in a spread spectrum time division duplex communication system having time slots for communication, the method comprising:

receiving a downlink communication and determining an interference power measurement for each downlink communication time slot;

transmitting an uplink communication having said interference power measurement for each downlink communication time slot; and

calculating an estimated interference power measurement for each time slot in a downlink communication; and

setting a transmission power level for each downlink communication time slot in response to said interference power measurement and said estimated interference power for each downlink communication time slot.

20. The method of claim 19 further comprising the steps of:

determining a residual interference power;

generating weights for weighing said residual interference, said interference power measurement and said estimated interference power;

combining residual interference power with said interference power measurement and said estimated interference power according to said weights.

21. A method for controlling downlink transmission power levels in a spread spectrum time division duplex communication system, wherein said communication system supports multiple concurrent communications over a common bandwidth, having multiple time slots and codes for distinguishing between communications, the method comprising:

a) calculating an estimated interference power measurement for each time slot based upon the power of each of said multiple communications communicated in said time slot; and

b) setting a transmission power level for each downlink communication time slot in response to said estimated interference power level for each downlink communication time slot.